

WHAT IS CLAIMED IS:

1. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of ring networks each of which
5 includes a plurality of nodes connected to each other
through a communication line,

said terminal apparatus for an operator
comprising:

a display unit;

10 operating means for accepting click operations by
a user;

information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

15 information processing means for managing
occurrence statuses of failures in said network system
based on said notification information acquired by said
information acquiring means; and

display controlling means for displaying
20 information processed by said information processing
means on said display unit,

wherein said display controlling means displays
a node icon associated with each node belonging to
a ring network to which a node connected with its own
25 apparatus belongs,

displays a line associated with said communication
line between said node icons on said display unit, and

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causes display modes of said node icon and said line to differ from each other depending on presence/absence of a failure in a corresponding node or communication line.

- 5 2. The terminal apparatus for an operator according to claim 1, wherein, when said each node includes a plurality of shelves,

 said display controlling means displays a first window on a screen of said display unit if any of said
10 node icons is clicked by said operating means,

 displays in said first window a type drawing showing a shelf configuration of a node corresponding to said clicked icon, and

 displays a plurality of shelves shown in said type
15 drawing in display modes which differ from each other depending on presence/absence of a failure in each shelf.

3. The terminal apparatus for an operator according to claim 2, wherein, when each of a plurality
20 of shelves includes one or a plurality of cards,

 said display controlling means displays a second window on said screen of said display unit if any shelf shown in said type drawing is clicked by said operating means,

25 displays a view showing a card configuration of said clicked shelf in said second window in said display unit, and

displays a plurality of cards shown in said view of a card configuration in display modes which differ from each other depending on presence/absence of a failure in each card.

5 4. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of ring networks each of which
includes a plurality of nodes,

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.      said terminal apparatus for an operator
10    comprising:

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a display unit;

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operating means for accepting click operations by
a user;
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information acquiring means for acquiring from
15 a connected node notification information concerning
a ring network to which said node belongs;

information processing means for managing statuses
of said network system based on said notification
information acquired by said information acquiring
means; and

display controlling means for displaying
information processed by said information processing
means on said display unit,

wherein said display controlling means displays
25 a third window on a screen of said display unit, and

displays in said third window a list of said notification information acquired by said information

5. The terminal apparatus for an operator according to claim 4, wherein said display controlling means displays a first button on said screen of said display unit,

displays in said fourth window an attribute specification section for arbitrarily selecting and specifying a plurality of said attributes, and selectively displays in said first window notification information having attributes specified in said attribute specification section.

6. The terminal apparatus for an operator according to claim 4, wherein said display controlling means displays a second button on said screen of said display unit,

displays a fifth window on said screen of said display unit when said second button is clicked by said operating means,

displays in said fifth window a section for
setting an order of displaying said attributes in said
third window, and
rearranging said order of said attributes

7. The terminal apparatus for an operator according to claim 4, wherein said display controlling means displays a third button on said screen of said display unit,

displays in said sixth window a list of nodes which are management targets of its own apparatus; and wherein, when one or a plurality of nodes displayed in said sixth window are specified by said operating means, said information acquiring means masks alarm information included in notification information transmitted from said specified nodes.

buzzer controlling means for controlling sounding
of said informing buzzer,

displays a seventh window on said screen of said display unit when said fourth button is clicked by said operating means, and

displays in said seventh window a condition

setting section for setting conditions for sounding
said informing buzzer; and

wherein said buzzer controlling means sounds said
informing buzzer under conditions set in said condition
5 setting section in said seventh window.

9. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of ring networks,

each of said ring networks including a plurality
10 of nodes,

each node including storing means for accumulating
a history of notification information concerning
network management,

said terminal apparatus for an operator
15 comprising:

a display unit;

operating means for accepting click operations by
a user;

information acquiring means for acquiring from
20 a connected node notification information concerning
a ring network to which said node belongs;

information processing means for managing statuses
of said network system based on said notification
information acquired by said information acquiring
25 means; and

display controlling means for displaying
information processed by said information processing

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displays in said eighth window a retrieval condition specification section for specifying a retrieval condition for retrieving desired notification information from a history accumulated in said storing means;

wherein said display controlling means display a ninth window on said screen of said display unit, and

displays in said ninth window notification information retrieved by said information processing means in a text format together with a plurality of attributes characterizing said retrieved notification information.

10. The terminal apparatus for an operator according to claim 9, further comprising operating means for accepting click operations by a user,

wherein said display controlling means displays
a fifth button on said screen of said display unit,

displays a 10th window on said screen of said display unit when said fifth button is clicked by said operating means,

displays in said 10th window an attribute specification section for arbitrarily selecting and specifying a plurality of attributes, and

selectively displays in said ninth window
5 notification information having attributes specified in said attribute specification section.

11. The terminal apparatus for an operator according to claim 9, further comprising operating means for accepting click operations by a user,

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10 wherein said display controlling means displays a sixth button on said screen of said display unit,

displays an 11th window on said screen of said display unit when said sixth button is clicked by said operating means, and

15 displays in said 11th window:

a section for specifying a node as an operation target and setting a maximum value of the size of a storage resource area of a history accumulated in said node; and

20 a section for individually setting the size of said storage resource area of a notification information history to be accumulated; and

wherein said information processing means can vary the size of said storage resource area of a history in
25 an arbitrary node in accordance with the content set in said 11th window.

12. A terminal apparatus for an operator used when

connected to an arbitrary node in a network system,
said network system including a plurality of ring
networks,

each of said ring networks including a plurality
5 of nodes,

each node including storing means for accumulating
a history of notification information including at
least quality information concerning communication
quality in said network system,

10 said terminal apparatus for an operator
comprising:

a display unit;

operating means for accepting click operations by
a user;

15 information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

information processing means for managing statuses
of said network system based on said notification
20 information acquired by said information acquiring
means; and

display controlling means for displaying
information processed by said information processing
means on said display unit,

25 wherein said display controlling means displays
a seventh button on a screen of said display unit,
displays a 12th window on said screen of said

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        displays in said 13th window:
        an operation target specification section for
specifying a node as an operation target and a channel
and a section thereof;

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a section for specifying whether notification is performed in accordance with each type of quality information measured with respect to an operation target specified in said operation target specification section;

a section for setting a level of importance in accordance with each type of quality information measured with respect to an operation target specified in said operation target specification section; and

a section for setting a threshold value used when performing notification for quality information measured with respect to an operation target specified in said operation target specification section; and

wherein said information processing means informs a node as said operation target of the content specified in said 13th window and informs said node of quality information in accordance with said content.

14. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of ring networks, each of said ring networks including a plurality of nodes, said terminal apparatus for an operator comprising:

a display unit;
information acquiring means for acquiring notification information respectively transmitted from a plurality of said nodes;

information processing means for managing occurrence statuses of alarms in said network system based on said notification information acquired by said information acquiring means; and

5 display controlling means for displaying information processed by said information processing means on said display unit,

 wherein said display controlling means displays a ninth button on a screen of said display unit,

10 displays a 14th window on said screen of said display unit when said ninth button is clicked by said operating means,

 displays in said 14th window:

15 a first section for specifying an operation target which is on a level of urgency of said alarm; and

 a second section for selecting an occurrence cause of said alarm for said operation target specified in said first section, and

20 reads a current set state of a level of urgency of said specified occurrence cause of said alarm with respect to a node having said operation target and displays a list of reading result in accordance with each occurrence cause when said operation target and said occurrence cause are specified in said 14th
25 window; and

 wherein said information processing means causes an operator of its own apparatus to individually set

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a level of urgency in accordance with each occurrence
cause of said alarm displayed in said list in said 14th
window, and

sets a level of urgency in accordance with each
5 set occurrence cause of said alarm with respect to
a node as said operation target.

15. The terminal apparatus for an operator
according to claim 14, wherein said display controlling
means displays a 10th button on said screen of said
display unit,

displays a 15th window on said screen of said display unit when said 10th button is clicked by said operating means, and

displays in said 15th window a section for causing
15 an operator of its own apparatus to specify a node as
an operation target and a shelf thereof and set
transmission or non-transmission of a maintenance
signal to said specified operation target in said 15th
window; and

20 wherein said information processing means sets the
content set in said 15th window to a node including
said operation target.

16. The terminal apparatus for an operator
according to claim 14, wherein said display controlling
25 means displays an 11th button on said screen of said
display unit,

displays a 16th window on said screen of said

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said terminal apparatus for an operator
comprising:

a display unit;

information acquiring means for acquiring from
a connected node notification information concerning
a ring network to which said node belongs;

5 information processing means for managing statuses
of said traffic bypass function in said network system
based on said notification information acquired by said
information acquiring means; and

10 display controlling means for displaying
information processed by said information processing
means on said display unit,

wherein said display controlling means displays
a 12th button on a screen of said display unit,

15 displays a 17th window on said screen of said
display unit when said 12th button is clicked by said
operating means, and

displays in said 17th window an arrow associated
with each path in a target ring network.

18. The terminal apparatus for an operator
20 according to claim 17, wherein said display controlling
means displays a 13th button on said screen of said
display unit,

25 displays an 18th window on said screen of said
display unit when said 13th button is clicked by said
operating means, and

displays in said 18th window a section for causing
an operator of its own apparatus to specify a

transmission interval as an operation target and causing an operator of its own apparatus to set values of parameters concerning said traffic bypass function with respect to said specified operation target; and

5 wherein said information processing means sets said values set in said section with respect to a node concerning said operation target.

19. The terminal apparatus for an operator according to claim 17, wherein said display controlling
10 means displays information indicative of a destination to which a path corresponding to said arrow displayed in said 17th window is dropped in association with said arrow.

20. The terminal apparatus for an operator according to claim 19, wherein said information
15 indicative of a destination to which a path is dropped includes at least a low-speed side channel number to which said path is dropped and information indicative of a type of concatenation of said path.

21. A communication path setting method in
20 a terminal apparatus for an operator including a display unit in a network system,

 said network including a plurality of ring
 networks, each of said ring networks including a
25 plurality of nodes which are connected to each other in a ring form through a communication line in which a plurality of communication paths are multiplexed,

a step of dividing a screen of said display unit into a plurality of areas in association with intervals between respective nodes in a ring network to which a node connected with its own apparatus belongs, and displaying in each of said divided areas an arrow associated with each communication path existing in said intervals;

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        a second step of specifying a low-speed side
channel of a node as an end point of said communication
path to be set;

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        a fourth step of repeating said first to third
steps when there is any other communication path to be
set;

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a sixth step of causing a node which has accepted

said request for setting a communication path to form a new communication path based on said request.

22. The communication path setting method according to claim 21, wherein said first and second steps also perform specification of a type of concatenation of said communication path to be set in addition to specification of a low-speed side channel of a node.

23. The communication path setting method according to claim 21, wherein, when said communication path to be set is a dual homing path,

said method further including a seventh step of specifying a low-speed side channel of a node as an intermediate drop point of said communication path to be set; and

wherein said first, second and seventh steps also perform setting in accordance with each type of node in addition to specification of a low-speed side channel of a node.

24. The communication path setting method according to claim 21, wherein said communication line includes a working system line and a preliminary system line; and

wherein, when each of a plurality of said ring networks includes a traffic bypass function for causing service traffic transmitted through said working system line to make a detour to said preliminary system line,

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wherein said display controlling means displays
a 14th button on a screen of said display unit,

displays in said 19th window a section for causing
5 an operator of its own apparatus to select one of nodes
existing in said network system and specify a board of
said selected node; and

26. The terminal apparatus for an operator according to claim 25, wherein said display controlling means displays a 15th button on said screen of said display unit,

displays in said 20th window a section for causing
an operator of its own apparatus to specify an
20 arbitrary node and specify a type of notification
information transmitted from said specified node; and

causes a user to set allowance or inhibition of

notification of said specified notification information
with respect to said destinations displayed as a list,
and

5 sets the content set in said 20th window with
respect to said specified node.

27. A terminal apparatus for an operator used when
connected to an arbitrary node in a network system
including a plurality of nodes,

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10 said terminal apparatus for an operator
comprising:

a display unit;

information acquiring means for acquiring from
a connected node notification information concerning
said network system;

15 information processing means for managing said
network system based on said notification information
acquired by said information acquiring means; and

display controlling means for displaying
information processed by said information processing
20 means on said display unit,

wherein said display controlling means displays
a 16th button on a screen of said display unit,

displays a 21st window on said screen of said
display unit when said 16th button is clicked by said
25 operating means, and

displays in said 21st window a list of operators
who are allowed to login to its own apparatus while

associating a name of each operator with an expiration date of a password and an access level of said each operator.

28. The terminal apparatus for an operator
5 according to claim 27, wherein said display controlling means displays a 17th button on a screen of said display unit,

displays a 22nd window on said screen of said display unit when said 17th button is clicked by said
10 operating means, and

displays in said 22nd window:

a section for causing an operator of its own apparatus to input his/her name; and

a section for causing said operator to input
15 his/her password and access level; and

wherein said information processing means newly registers said operator inputted in said 22nd window as a user whose can login to its own apparatus.

29. The terminal apparatus for an operator
20 according to claim 27, wherein said display controlling means displays an 18th button on said screen of said display unit,

displays a 23rd window on said screen of said display unit when said 18th button is clicked by said
25 operating means, and

displays in said 23rd window a section for causing an operator of its own apparatus to select an arbitrary

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wherein said information processing means reads
a name of a terminal apparatus for an operator
registered in a node selected in said 23rd window from
said selected node; and

30. The terminal apparatus for an operator according to claim 27, wherein said display controlling means displays a 19th button on said screen of said display unit,

displays in said 24th window:

a section for causing an operator of its own apparatus to select an arbitrary terminal apparatus for an operator in said network system; and

a section for causing an operator of its own apparatus to set an access level with respect to said terminal apparatus for an operator selected in said section; and

wherein said information processing means
determines a node selected in said 24th window as
a control target of said terminal apparatus for

an operator selected in said 23rd window and registers it together with said selected access level.

31. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of nodes,

said terminal apparatus for an operator
comprising:

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a display unit;
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information acquiring means for acquiring from
a connected node notification information concerning
said network system;

information processing means for managing said network system based on said notification information acquired by said information acquiring means; and

display controlling means for display information
processed by said information processing means on said
display unit,

wherein said display controlling means displays
a 20th button on a screen of said display unit,

displays a 25th window on said screen of said display unit when said 20th button is clicked by said operating means,

displays in said 25th window:

a section for causing an operator of its own
apparatus to select an arbitrary node in said network
system;

a list of a current set status of an operation

reference time in accordance with each node selected in said section; and

a section for causing a user to select an arbitrary apparatus from said list and causing a user to individually set an operation reference time with respect to said selected apparatus; and

wherein said information processing means sets said operation reference time set in said 25th window with respect to said selected node.

32. A terminal apparatus for an operator used when connected to an arbitrary node in a network system including a plurality of nodes,

said terminal apparatus for an operator comprising:

a display unit;

information acquiring means for acquiring from a connected node notification information concerning said network system;

information processing means for managing said network system based on said notification information acquired by said information acquiring means; and

display controlling means for displaying information processed by said information processing means on said display unit,

wherein said display controlling means displays a 21st button on said screen of said display unit, displays a 26th window on said screen of said

display unit when said 21st button is clicked by said operating means,

displays in said 26th window color specification buttons in accordance with each possible state that

5 an object displayed on said screen of said display unit may enter,

displays a color pallet when an arbitrary one of said color specification buttons is clicked, and causes an operator of its own apparatus to set a display color
10 in a state corresponding to said color specification button, and

displays an object displayed on said screen of said display unit in a display color set in said color pallet.

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